REMARKS

In an Office Action dated September 16, 2005, claims 1, 5-8, 12, 16 and 22 were rejected under 35 U.S.C. 102(b) as being anticipated by Thornton (U.S. 6,208,681). Claims 2-4, 9-11, 13-14, 18, 20, and 22, 23 were rejected under 35 U.S.C. 103(a) as being obvious in view of the aforementioned Thornton reference. For the reasons set forth below Applicant respectfully submits that Thornton is insufficient to render a *prima facie* case of obviousness.

With respect to independent claim 1, 12, and 22, Applicant respectfully submits that Thornton is insufficient to render a prima facie case of obviousness, much less anticipate Applicant's claims, because (1) Thornton does not disclose or suggest a contact that simultaneously provides current to the first and second VCSEL and (2) even if simultaneous current was provided to adjacent VCSEL, the Thornton structure does not enable mode coupling or mode locking between a first VCSEL and an adjacent second VCSEL.

The architecture of the contact is further described further below in relation to independent claim 21, however it is clear that Thornton's keyhole shaped contact is designed to address a single and not to simultaneously provide current to several lasers. There is nothing in Thornton to describe or suggest simultaneously providing current, and such a detailed patterning of contacts would be unnecessary if the contacts were simply to be shorted together. Thus there is no suggestion or teaching in Thornton to simultaneously provide current to multiple lasers.

However, more importantly, even if current was simultaneously provided, the lasers in Thornton would not mode lock. Applicant notes that the design of an array of mode coupled devices is very different to the design of individual laser devices. In an individual laser device, it is important to have adequate optical and electrical confinement and isolation in each individual laser, otherwise the device will not lase. In Thornton, this isolation is achieved by the use of isolation regions such as region 130 of Figure 8 that by definition have no gain. See Col 7:10-20. Furthermore Thornton teaches away from allowing stray fields to cause mode coupling by emphasizing the need for adequate confinement. In Column 6, lines 30-35, Thornton notes that a small

non-oxidized gap between oxidized regions may be permissible as long as electrical and optical fields are adequately confined. Isolation regions 130 are important to such confinement.

In the array structures claimed in Applicant's present invention, the interaction between adjacent devices is important and facilitated. Applicants purpose in this invention is that the fields are not so confined, thereby allowing mode coupling to occur. Applicant intentionally designs regions between adjacent VCSELs to allow evanescent fields to cross over into adjacent VCSEL active regions and induce mode coupling or mode locking as claimed in independent claims 1, 12 and 22. Instead of isolation regions, Applicant often uses gain regions to facilitate gain between adjacent lasers. The Thornton reference makes no suggestion of mode coupling interactions nor the structures needed to make such interactions occur, and Applicant respectfully submits the isolation regions of Thornton as well as the described confinements prevent such mode coupling between adjacent VCSELS as claimed in independent claims 1, 12 and 22. Thus Applicant respectfully submits that Thornton is insufficient for a prima facie case of obviousness with respect to claims 1, 12 and 22.

Applicant also submits that Thornton is insufficient to render a prima facie case of obviousness with respect to independent claim 21 because as previously described, Thornton does not disclose a contact to simultaneously provide current to the first VCSEL and the second VCSEL. In particular, Applicant notes that Thornton is not designed to simultaneously provide current to the first VCSEL and the second VCSELs to cause mode locking as described in claim 1. The Office Action cites Col 7: 15-40 and Col 8: 60-67 of Thornton to try and support a description for such a contact. However, the cited reference merely describes the general formation of contacts. In fact, reading further Col 7: 25-50 of Thornton takes great pains to describe how the contacts are formed in a keyhole shape as shown in Figures 9 and 10 to allow each contact to correspond to an individual laser, thus allowing each laser to be an independent laser that can be individually addressed. Nowhere is simultaneous addressing described and clearly no single contact is designed to simultaneously address two lasers. Furthermore, Thornton uses ion implantation to create highly

resistive regions between lasers further electrically isolating each individual laser (see Col 7: 10-15). Such detailed description of how to form the individually addressable contacts and keep them separate would be unnecessary if the lasers are to be simultaneously addressed because current will be provided to all the lasers at once. Although it may be possible to simultaneously address two lasers using external electronics, such a scenario is neither described nor suggested by Thornton and thus cannot be used as a reference for the described structure and method. In short, independent claim 21 specifically recites a contact that simultaneously provides current to the first VCSEL and the second VCSEL. No such single contact is shown in Thornton and thus Thornton does not disclose nor suggest, and thus cannot render obvious, claim 21.

Applicant also respectfully submits that claim 2, 4, 13, 20 and independent claim 26 are not rendered obvious by Thornton. It was acknowledged in the Office Action that Thornton does not disclose a high gain region positioned between a first VCSEL and a second VCSEL. Instead it was argued that Col 5:30-40, 55-67 and Col 10 disclose using dopants or ion implantation to increase the gain in a high gain region. Applicant respectfully disagrees. Thornton use of dopants in Col 5:30-40 and 55:67 is just creating the standard p-n junction in a laser and is very standard procedure. It is also done throughout the cladding layer and thus has nothing to do with creating a high gain region between lasers. Thornton Col 7:10-20 does mention ion implantation in regions between lasers, however the ion implantation does not create a high gain region between lasers. In fact, Thornton does the exact opposite. The ion implantation described in Thornton is a Hydrogen ion implantation designed to create a highly resistive isolation region between lasers. This region is designed to carry no current and thus has no gain. Thus not only is Thornton insufficient to create a prima facie case of obviousness because (1) Thornton does not disclose positioning a high gain region between VCSELs and (2) Thornton does not describe using high gain region for mode coupling, Thornton actually describes in detail creating isolation (zero gain) regions between lasers. The Office Action goes on to say that because Thornton describes creates a high gain region using doping and ion implantation (an assertion

with which Applicant has already disagreed), it would be obvious to move these high gain regions to areas between lasers, the motivation being provided by Applicant's specification. Applicant respectfully submits that such hindsight reconstruction is impermissible. See In re Gorman 933 F.2d 982, 18 USPQ2d 1885 (Fed. Cir. 1991) and In re Glaug 283 F.3d 1339, 62 USPQ2d 1001 (Fed. Cir. 2001).

Likewise, Applicant respectfully submits that claims which define the characteristics of the high gain doping region between VCSELs or contacts to the high gain regions between VCSELs such as claims 3, 14, 18, 24, 25 and 27-32 are nonobvious because such details cannot be rendered prima facie obviousness by a reference that does not even show or suggest a high gain region between VCSELs.

In view of the preceding amendments and remarks, Applicant respectfully submits that the claims as amended are allowable over the cited prior art reference, and allowance is hereby respectfully requested. In the event that the Examiner believes a teleconference would facilitate prosecution, Applicant respectfully requests that Examiner contact the undersigned.

Respectfully submitted,

Kent Chen
Attorney for Applicant(s)
Registration No. 39,630
(310) 333-3663
January 17, 2006